



[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 91

Docket No. FAA-2019-0539

Statement of Policy on Performance Requirements for Operators of Aircraft that are Equipped with Automatic Dependent Surveillance-Broadcast (ADS-B) Out

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Policy statement.

SUMMARY: This action announces the FAA's policy on performance requirements for certain operations of aircraft with Automatic Dependent Surveillance-Broadcast (ADS-B) Out equipment in ADS-B airspace after January 1, 2020. Under the circumstances identified in this policy, the FAA is providing assurance to operators that it will not consider degradation in Global Positioning System performance due to conditions outside the operator's control that results in an operation falling below ADS-B rule requirements to constitute non-compliance, provided the operator has exercised appropriate due diligence prior to conducting an operation.

DATES: The policy described herein is effective January 2, 2020.

FOR FURTHER INFORMATION, CONTACT: For technical information concerning this action, contact David Gray, Surveillance and Broadcast Group Manager, Air Traffic Organization, at (202) 267-3615.

SUPPLEMENTARY INFORMATION:

Authority for this Action

The FAA's authority to issue rules on aviation safety is found in Title 49 of the United States Code (49 U.S.C.). Subtitle I, Section (§) 106, describes the authority of the FAA

Administrator. Subtitle VII, Aviation Programs, describes in more detail the scope of the agency's authority.

The ADS-B Out equipage and performance requirements were promulgated under the authority described in Subtitle VII, Part A, Subpart I, Section 40103, Sovereignty and use of airspace, and Subpart III, Section 44701, General requirements. Under section 40103, the FAA is charged with prescribing regulations on the flight of aircraft (including regulations on safe altitudes) for navigating, protecting, and identifying aircraft, and the efficient use of the navigable airspace. Under section 44701, the FAA is charged with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce.

Under § 91.227 of Title 14 of the Code of Federal Regulations (14 CFR), which was issued in accordance with the FAA's statutory authority in sections 40103 and 44701, the FAA set forth the ADS-B Out equipment performance requirements, including accuracy and integrity performance standards. This policy statement informs operators about how the FAA will handle: (1) operators when their avionics produce broadcast elements with values less than required by § 91.227 due to circumstances beyond the operator's control; and (2) circumstances in which the operator cannot use the Service Availability Prediction Tool (SAPT) due to a system outage.

I. Background

In 2010, the FAA issued a final rule prescribing equipage requirements and performance standards for ADS-B Out avionics on aircraft operating in certain airspace after January 1, 2020.¹ ADS-B Out is an advanced surveillance technology that combines an aircraft's positioning source, other aircraft avionics, and a receiver infrastructure to create an accurate and shared

¹ Final Rule, Automatic Dependent Surveillance-Broadcast (ADS-B) Out Performance Requirements to Support Air Traffic Control (ATC), 75 FR 30160 (May 28, 2010).

surveillance picture between aircraft and air traffic control (ATC). ADS-B Out provides air traffic controllers with real-time position information that is, in most cases, more accurate than the information available with current radar-based systems. With more accurate information, ATC will be able to position and separate aircraft with improved precision and timing so that efficiency and capacity will increase beyond current levels to meet the predicted demand for ATC services while maintaining or improving safety.

ADS-B Position Sources

Aircraft with ADS-B Out equipment continually broadcast information, such as identification, current position, altitude, and velocity, through an onboard transmitter, which can be received by ADS-B ground stations (or other capable receivers) and by other aircraft appropriately equipped to receive this information. The ADS-B Out rule specifies the aircraft's ADS-B Out equipment performance requirements for each flight in rule airspace rather than requiring any particular type of position source. All currently approved position sources rely on a Global Positioning System (GPS) receiver.² The quality of each type of receiver can be described by its "rule performance" availability, which means the GPS receiver's ability to achieve the performance requirements of § 91.227(c)(1)(i) and (iii) for Navigation Accuracy Category for Position (NACp) and Navigation Integrity Category (NIC). Technical Standard Order (TSO)-C166b and TSO-C154c contain the avionics standards for outputting NACp and NIC. To date, Wide Area Augmentation System (WAAS) is the only GPS position source that consistently provides the equivalent availability to radar.³ Operators who equip with GPS position sources

² GPS is a specific type of Global Navigation Satellite System (GNSS).

³ FAA has determined that certain GPS tightly integrated with inertial navigation systems will also provide 99.9 percent availability.

such as Selective Ability⁴-On (SA-On) or SA-Aware are more likely to experience performance outages that limit their access to the airspace defined in the rule.⁵

FAA ADS-B Service Availability Prediction Tool (SAPT)

The ADS-B SAPT is a preflight availability prediction tool, developed by the FAA, that predicts the ability of an aircraft to meet the requirements of § 91.227(c)(1)(i) and (iii) along a given route of flight. This prediction is based on the ability of the aircraft's position source (GPS receiver) to meet performance requirements specified in FAA TSOs C129, C129a, C145c/C146c, and C196, as well as the predicted status of the GPS constellation. The SAPT will also evaluate if backup surveillance is available where ADS-B outages are predicted.⁶ The ADS-B SAPT is primarily intended for pilots, dispatchers, and commercial operators to verify their predicted surveillance availability before flight and ensure compliance with the ADS-B Out rule.⁷

Exemption No. 12555

In April 2015, Airlines for America (A4A) petitioned the FAA, on behalf of A4A member airlines, for an exemption from the Navigation Accuracy Category for Position (NACp) and Navigation Integrity Category (NIC) requirements of the rule. In August 2015, the Administrator issued Exemption No. 12555, a time-limited grant of exemption from § 91.227(c)(1)(i) and (iii) for the period from January 1, 2020 through December 31, 2024.

Exemption No. 12555 permits operations in ADS-B Out rule airspace during periods when the

⁴ SA was a feature that deliberately degraded the GPS satellite signal, resulting in a reduction of the reported accuracy of an aircraft's position. On May 1, 2000, the United States deactivated SA to allow more accurate civilian use of GPS. SA is not included in new GPS satellite designs.

⁵ For additional information about SA-On and SA-Aware, please refer to Exemption No. 12555 at <https://www.regulations.gov/searchResults?rpp=25&po=0&s=FAA-2015-0971&fp=true&ns=true>.

⁶ FAA plans to begin divestiture of some radar infrastructure as part of the transition to a satellite-based navigation and surveillance system. During the period from 2020 to 2025, FAA's planned radar divestitures will focus primarily on eliminating redundant/overlapping radars.

⁷ For more information on the SAPT, the FAA has developed the ADS-B SAPT/Receiver Autonomous Integrity Monitoring (RAIM) User Guide, which is available at <https://sapt.faa.gov/adsb-start.php>.

GPS position provided to the installed ADS-B Out equipment does not achieve the required accuracy or integrity performance, provided certain conditions and limitations are met.

For those aircraft meeting the performance requirements of TSO-C196 (SA-Aware), the operator is not required to perform a preflight availability prediction prior to conducting an operation under the exemption.⁸ For operators having aircraft equipped with TSO-C129 (SA-On) approved GPS receivers that do not meet the performance requirements of TSO-196 or TSO-C145/146, the operator must run a preflight prediction.⁹ Although the exemption does not require operators with SA-On to use the SAPT for preflight availability prediction, if the operator uses its own preflight availability prediction tool and receives an indication that performance will fall below rule requirements, it must use SAPT to determine whether backup surveillance is available along the planned route of flight per Exemption No. 12555.

SA-On and SA-Aware without Exemption No. 12555 relief

Some operators of aircraft with SA-On and SA-Aware receivers did not petition the FAA for relief under Exemption No. 12555. As such, they are not exempt from meeting the performance requirements in § 91.227(c)(1)(i) and (iii). Under § 91.103, a pilot in command is required before beginning a flight to become familiar with all available information concerning that flight, which includes, among other things, conducting due diligence to confirm that a planned route of flight will comply with the ADS-B performance requirements in § 91.227(c)(1)(i) and (iii).¹⁰ Given the previously identified limitations of SA-On and SA-Aware receivers, the use of a preflight prediction tool is a reliable way of satisfying due diligence

⁸ To accommodate these aircraft in the system under the requested exemption, the FAA effectively accepted the risk of degraded performance from SA-aware GPS receivers (if the GPS constellation is degraded). The FAA noted, however, that it could not accept this risk indefinitely and limited the relief in the exemption to 5 years.

⁹ For SA-on GPS receivers using the current GPS constellation, the rule performance availability is approximately 95 percent or higher.

¹⁰ Under part 121, the aircraft dispatcher (or director of operations for supplemental operations) shares operational control with the pilot in command and is jointly responsible for preflight planning. Generally, the aircraft dispatcher will perform the preflight prediction to satisfy preflight planning requirements.

requirements under § 91.103. Operators may use any reliable preflight prediction tool; however, the SAPT currently provides a comprehensive and reliable preflight prediction for operators.

II. Discussion of FAA's Policy

After January 1, 2020, unless otherwise authorized by ATC, all aircraft operating in the airspace identified in § 91.225 must comply with the ADS-B Out equipage and performance requirements in §§ 91.225 and 91.227. Nothing in this notice shall be deemed to modify or alter those requirements established in the 2010 final rule.

In this notice, the FAA explains circumstances outside of an operator's control that may result in a temporary degradation of GPS performance and an apparent violation of § 91.227. The purpose of this notice is to announce FAA's policy for certain operations of aircraft with ADS-B Out that may encounter such circumstances, including: (1) operations that are required to use SAPT under the conditions of Exemption No. 12555 or non-exemption holders required to conduct preflight due diligence under § 91.103 to confirm preflight availability; (2) operations that may encounter GPS interference; and (3) operations that may be affected by a SAPT outage. Although it could appear that an operator has not complied with the performance requirements in § 91.227 due to the circumstances described in this document, the FAA would not consider these situations to constitute a violation as such an application of the regulations would impose a standard of conduct wholly outside the operator's control. The FAA cautions that, for operators who have been notified by the FAA of consistent and repeated ADS-B Out performance issues, conducting an operation in accordance with the policy described herein without first redressing the identified non-performance issue will be considered a continuation of existing non-compliance with the performance requirements.

A. Preflight prediction for certain operators

As previously discussed, certain operators are required to use a preflight availability prediction tool to predict the ability of an aircraft to meet the performance requirements of § 91.227(c)(1)(i) and (iii) along a given route of flight. For exemption holders with SA-On receivers, the preflight availability prediction must be performed as part of an operator's preflight planning process. For non-exemption holders with SA-On and SA-Aware receivers, the preflight availability prediction tool is part of the preflight action necessary to ensure rule compliance on a planned route of flight. If the predicted GPS performance does not support the proposed flight, the operator may need to adjust the flight plan accordingly to avoid the degraded GPS performance.

After an operator receives a satisfactory preflight availability prediction for an intended operation, there may be certain conditions that warrant a subsequent prediction. For example, a change in departure time or a change in the GPS satellite constellation as indicated by a Notice to Airmen (NOTAM) may have an effect on the predicted GPS performance for the intended operation. If an operator becomes aware of a change that could result in degraded GPS performance prior to receiving an initial ATC clearance for the intended route of flight, the operator should – consistent with preflight action required by § 91.103 – conduct a subsequent preflight availability prediction for the planned flight to ensure that GPS performance is still predicted to comply with the performance requirements of § 91.227(c)(1)(i) and (iii).

The duty to conduct a subsequent preflight availability prediction for an intended route of flight will cease once an operator receives an ATC route clearance for the intended operation. More specifically, if an operator receives a satisfactory preflight availability prediction and an ATC route clearance for the intended operation, the FAA will consider the operator as having exercised its due diligence in ensuring the intended operation complies with the performance requirements in § 91.227. Therefore, upon receiving a satisfactory preflight availability

prediction and an ATC clearance for an intended route of flight, the operator will be deemed to have complied with the preflight availability prediction requirement and the performance requirements of § 91.227(c)(1)(i) and (iii).

The FAA recognizes that there are circumstances outside the operator's control that may result in unanticipated changes to an operator's planned route of flight, which may cause temporary degraded GPS performance and technical noncompliance with § 91.227(c)(1)(i) and (iii). For example, ATC will continue to exercise its responsibility for the safe and efficient movement of air traffic, including changes to the routing of traffic to achieve those objectives. In addition, a planned route of flight may be changed due to environmental conditions, such as a thunderstorm, or an operator may experience unexpected GPS degradations during flight. After an ATC route clearance is obtained for the flight, the FAA does not expect an operator to conduct a subsequent preflight availability prediction to accommodate rerouting caused by ATC or environmental conditions.

The FAA notes that the policy described above applies only to those operators who have exercised due diligence in complying with the preflight availability prediction and ADS-B Out performance requirements. For example, if an operator fails to conduct a preflight availability prediction for the operator's intended operation and subsequently encounters degradation of GPS performance that results in the aircraft falling below the performance requirements of § 91.227(c)(1)(i) and (iii), that operator will be deemed to have violated the ADS-B rule—even if the operator's flight were rerouted due to unforeseen circumstances.

When an operator performs a preflight availability prediction using the FAA's SAPT, the SAPT retains a record of each transaction enabling the FAA to confirm that an operator took preflight action. The FAA recommends that operators using an alternate tool retain documentation that verifies the completion of the satisfactory preflight availability prediction for

each intended route of flight. The FAA recommends that the prediction should be done not more than 24 hours prior to the planned departure. Predictions using SAPT to determine the availability of backup surveillance per Exemption No. 12555 should be done within the 3 hours prior to planned departure.

GPS Interference.

There may be times when the GPS position source cannot meet the required technical performance due to planned GPS interference. In the event of a scheduled interference outage of GPS, the FAA will issue a NOTAM that identifies the airspace and time periods that may be affected by the interference. The affected area will frequently encompass a large radius of ADS-B Out rule airspace. The FAA finds that requiring operators to avoid the affected area would cause significant disruption to air traffic in that vicinity. Furthermore, there is no guarantee that these operators would experience actual interference and a degradation in GPS performance in the area. For these reasons, the FAA has determined that it would be impractical and not in the public interest to require operators to avoid the affected area based on the chance that an otherwise compliant flight could experience GPS interference.

Accordingly, operators should proceed with their intended operation if the only impediment to their operation is possible planned GPS interference. Under this policy, an operator who is required to perform a preflight availability prediction for the intended route of flight is still required to obtain a satisfactory preflight availability prediction. When a NOTAM identifies the airspace and time periods that may be affected by GPS interference, an operator will not be required to alter his or her route of flight to avoid the area based solely on that NOTAM. As explained in the preamble to the final rule, if an aircraft's avionics meet the performance requirements but unexpected GPS degradations during flight inhibit the position source from providing adequate accuracy and integrity, ATC will be alerted via the aircraft's

broadcasted data and services will be provided to that aircraft using the backup strategy. If an operator encounters actual GPS interference during their flight that results in a degradation of ADS-B Out performance, the policy described in Part II above will apply, provided the operator has taken the appropriate preflight actions.

SAPT Outages

As noted, certain operators are required to use a preflight availability prediction tool prior to a planned flight as a condition of Exemption No. 12555. Other operators with SA-On and SA-Aware equipment who do not hold this exemption exercise due diligence, as required under §91.103, that a planned route of flight will comply with ADS-B performance requirements under § 91.227(c)(1)(i) and (iii). Some operators will use the FAA SAPT for this purpose. The FAA intends that SAPT will be continuously available to operators. However, because unexpected circumstances could lead to a SAPT outage, the inability to access the tool could have an adverse impact on operators with SA-On or SA-Aware GPS receivers. As previously noted in Advisory Circular (AC) 90-114A CHG 1 *Automatic Dependent Surveillance Broadcast Operations*, ATC will issue a NOTAM announcing when the SAPT is not available.

The FAA understands that a SAPT outage prevents those operators who hold relief under Exemption No. 12555 from confirming the availability of back-up surveillance as required under the exemption's conditions and limitations.¹¹ It also reduces the ability of non-exemption holders without their own preflight availability prediction tool to determine that a particular operation will meet the performance requirements prior to conducting an operation. The unavailability of the SAPT for brief periods would result in operators having to choose between conducting flights that might result in non-compliance and not conducting an operation that would have complied

¹¹ The FAA anticipates that any outage would be of short duration and any potential risk would be minimal because, concurrent with the outage, GPS performance would have to fall below rule values on the route of flight and radar coverage would have to be unavailable at the same time and location.

with ADS-B Out rule performance. The FAA does not intend to inhibit operators from conducting otherwise permissible operations when the SAPT is unavailable. As such, when there is a SAPT outage, the policy described above will apply to operators who rely on the SAPT if their operation falls below the performance requirements.

Implementation

Additional information for operators on the policy described in this document will be contained in other FAA publications, including AC 90-114 and the *Notices to Airmen* publication.¹²

Summary

After January 1, 2020, unless otherwise authorized by ATC, all aircraft operating in the airspace identified in § 91.225 must comply with the ADS-B Out performance requirements in § 91.227. As described above, however, there are circumstances outside of an operator's control that may result in a temporary degradation of GPS performance and an apparent violation of § 91.227. An operator may exercise due diligence in performing a preflight availability prediction for its intended route of flight but experience rerouting by ATC after obtaining an initial ATC route clearance, which may cause an unanticipated degradation of performance. Additionally, an operator may encounter actual GPS interference on its intended path of flight, which would affect the ability of an aircraft to meet the performance requirements of § 91.227. Lastly, an operator may not be able to complete a preflight availability prediction for its intended route of flight due to the FAA's SAPT being out of service. As previously explained, the FAA recognizes that these situations are outside of the operator's control. Therefore, the FAA will not consider these events to constitute noncompliance with § 91.227 due to the circumstances

¹² The *Notices to Airmen* publication is published every 28 days. The latest two editions of the publication are available on the FAA's website at https://www.faa.gov/air_traffic/publications/notices/

discussed in this document to the extent such an application would impose a standard of conduct wholly outside the operator's control.

Issued in Washington, D.C. on June 26, 2019.

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Air Traffic Organization

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